

RTP ENVIRONMENTAL ASSOCIATES INC.®
AIR · WATER · SOLID WASTE CONSULTANTS



304-A West Millbrook Road
Raleigh, North Carolina 27609
(campbell@rtpenv.com)

(919) 845-1422
Fax: (919) 845-1424

June 23, 2010

Mr. Brian Gustafson
Administrator, Air Quality Program
South Dakota DENR
Joe Foss Building
523 East Capitol
Pierre, SD 57501

Re: Hyperion Energy Center – Air Quality Preconstruction Permit # 28.0701
Application for Extension of Commence Construction Deadline

Dear Mr. Gustafson:

As we have discussed, Condition 2.1 of the referenced air quality preconstruction permit provides that an extension of the current "commence construction" deadline of February 20, 2011, may be granted by the DENR Secretary upon a satisfactory demonstration that an extension is justified.

We submit, based on the information provided below, that an extension until August 20, 2012, is justified. We have generally relied upon a July 1985 U.S. EPA policy document (included as Attachment 1) in identifying the information pertinent to DENR's review of this request.

Good Faith Effort. Hyperion Refining LLC ("Hyperion") still has every intention of moving forward with development of the Hyperion Energy Center ("HEC"), with construction planned to commence by December 2011, pending ongoing permitting and licensing processes.

Ambient Air Quality Impacts Analysis. RTP is currently in the process of completing a supplemental analysis of the ambient air quality impacts of the HEC, in order to assess compliance with recently promulgated revisions to the National Ambient Air Quality Standards for nitrogen dioxide and sulfur dioxide. That analysis will be submitted under separate cover.

BACT Review. RTP has reviewed the BACT determinations previously made by DENR and has determined that the emission limits in the referenced permit continue to represent BACT, with two exceptions:¹

¹ Hyperion maintains that the carbon monoxide emission limit established as BACT for twenty of the refinery fuel gas-fired process heaters at the HEC is not achievable. Hyperion's appeal of that BACT determination is pending, and the issue is not addressed further herein.

Sulfur Recovery Plant. Under the emission limits representing BACT for the sulfur recovery plant at the HEC, allowable annual emissions are 49 tons PM₁₀, 500 tons SO₂, 107 tons NO_x, 9 tons VOC, and 142 tons CO. These emission limits are based on a configuration including six parallel Claus sulfur recovery units, each with a tail gas treating unit and a thermal oxidizer. In the currently permitted configuration, exhaust from each train (i.e., from each thermal oxidizer) is emitted directly to atmosphere.

RTP has since identified an alternative configuration that will achieve substantially greater emission reductions. In this alternative configuration, tail gas from each Claus reactor train will be recycled to the acid gas removal process, avoiding any emissions, during normal operations. Only during sulfur recovery unit startup operations will emissions be routed to the thermal oxidizers and to atmosphere. There will be two thermal oxidizers, rather than the currently permitted six, and the two will not operate simultaneously. Proposed emission rates are as follows:

long tons/day	hrs/yr	MMBtu/hr	Pollutant	lb/MMBtu	lb/hr	tons/yr
2040	240	101	NO _x	0.06	6.0	0.3
			SO ₂	n/a	38.0	1.9
			CO	0.082	8.3	0.4
			VOC	0.005	0.5	0.0
			PM ₁₀	n/a	3.7	0.2
			H ₂ SO ₄	n/a	2.9	0.1
			H ₂ S	n/a	0.3	0.0

As shown above, adopting this state-of-the-art configuration for the sulfur recovery plant at the HEC is projected to reduce emissions of PSD pollutants by more than 99 percent relative to currently permitted emissions. This is the top-ranked control option, so no further evaluation of economic, energy, or environmental impacts has been performed.

Coke Drum Steam Vents. The BACT determination proposed by Hyperion and made by DENR for the coke drum steam vents in the delayed coking units at the HEC is a combination of equipment design and work practice requirements. Specifically, the permit requires compliance with the provisions of subpart Ja of 40 CFR part 60, which mandates a maximum allowable gauge pressure of five lbs per square inch (5 psig) in the coke drums prior to opening the atmospheric vent. No numeric emissions standards are established.

Based on a review of currently available information, RTP has determined that the BACT determination should be revised in two ways. First, recent testing has shown that reference method test procedures can be successfully applied to coke drum steam vents. As a result, there is no basis for concluding that technological or economic limitations on the application of measurement methodology would make the imposition of numeric emissions standards

infeasible. The PSD regulation requires that numeric emissions standards, rather than equipment design standards or work practice requirements, be established in such an instance.² Second, RTP has also determined that depressuring the coke drums to 2 psig has now been demonstrated in practice and must be considered a technically feasible control technique for the HEC. This technique, which was evaluated in the initial BACT analysis for the HEC but was rejected based on technical infeasibility because it had not been demonstrated in practice, is the most effective control option for all regulated NSR pollutants emitted from the coke drum steam vents.

The achievable rates for emissions of VOC and PM from the HEC are based on test data gathered at a refinery in St. Croix, U.S. Virgin Islands, and placed in the rulemaking docket for subpart Ja. These data are included as Attachment 2a hereto. Based on RTP's analysis of these test data, emissions of regulated NSR pollutants from the coke drums can be predicted as a function of release pressure using the following equations:

$$\text{PM, lb/ drum/cycle} = \left(\frac{\text{charge}}{\# \text{ drums}} / \frac{65}{4} \right) (-1.5041P^2 + 17.603P + 3.7022)$$

$$\text{VOC, lb/ drum/cycle} = \left(\frac{\text{charge}}{\# \text{ drums}} / \frac{65}{4} \right) (2.6378P^3 - 33.487P^2 + 144.5P + 37.706)$$

Where:

Charge = Delayed coking unit charge rate, 1000 barrels/day
drums = Number of delayed coking unit drums
P = Drum release pressure, psig

Other pollutants detected during the testing at the St. Croix refinery are H₂S and SO₂. As shown in Attachment 2b hereto, these pollutants were tested only by analysis of samples collected in evacuated Tedlar bags, so rigorous analysis of test results and extrapolation to a drum release pressure of 2 psig is not possible. In addition, the SO₂ results were below detection limits for two of the four samples. We propose that an H₂S limit be established and used as a surrogate to represent emissions of all sulfur species, including SO₂. The achievable emission rate for H₂S has been calculated based on a ratio with total lb/drum/cycle VOC emission rates from the testing at the St. Croix refinery.

Using the HEC coke drum design release pressure of 2 psig and design charge rate of 120,000 barrels per day (15,000 barrels per day per coke drum), and assuming 2,190 annual drum cycles, the achievable emission rates and potential annual emissions are as follows:

	VOC	H ₂ S	PM
lb/drum/cycle	127.8	70.9	30.3
tons/yr	139.9	77.6	32.9

² See, for example, 40 CFR § 52.21(b)(12). Note that the delayed coking units at the HEC will still be required to comply with the requirements of subpart Ja, which are currently codified as equipment design standards and work practice requirements rather than numeric emissions standards.

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This is the top-ranked control option for the coke drum steam vents at the HEC, so no further evaluation of economic, energy, or environmental impacts has been performed.

Should you have any questions or require additional information, please contact me at (919) 845-1422, extension 20.

Sincerely,

A handwritten signature in black ink, appearing to be 'Colin M. Campbell', written in a cursive style.

Colin M. Campbell
Project Manager

cc: Rick Addison, Munsch Hardt
Preston Phillips, Hyperion